

TECHNICAL MEMORANDUM

PREPARED FOR: Chicken of the Sea (COS) Samoa Packing Company, Inc.
(NPDES Permit AS0000027)

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SUBJECT: **Chemical Analysis of Effluent:
November 1998 Sampling**

PROJECT: 147323.JC.EM

Purpose

This memorandum presents the results of the chemical analyses of COS Samoa Packing effluent samples that were collected in November 1998. This was the twelfth sampling and analysis episode conducted under the current NPDES permit.

Study Objectives

Section D.2 of COS Samoa Packing's NPDES permit (AS0000027) requires that semiannual priority pollutant analyses be conducted on the cannery effluent. Each effluent sampling event must coincide with effluent sampling for acute biomonitoring. Effluent samples are collected as composite samples as described below. The purpose of these analyses is to identify the chemicals present in the effluent, and provide data to determine whether the wastewater discharge complies with water quality standards.

Effluent priority pollutant analyses include those chemical constituents listed in 40 CFR 401.15. As documented in the Technical Memorandum describing the results of the March 1995 sampling (CH2M HILL, 20 June 1995) the U.S. Environmental Protection Agency Region 9 has allowed COS Samoa Packing to exclude a number of previously measured constituents in the priority pollutant list. The constituents currently included in the effluent chemistry analyses are listed in Table 1.

Methods

Between 1200 on 19 November and 0900 on 20 November 1998, a 24-hour, flow-weighted composite sample of final effluent was collected from the COS Samoa Packing treatment plant discharge. Effluent composite samples were collected simultaneously for chemistry and bioassay analyses. Table 1 lists the chemical analyses, detection limits, sample holding times, sample containers, and sample preservations for the effluent sample collected for chemical analysis. The standard operating procedures (SOP) for the joint cannery outfall chemistry sampling is

Effluent Chemical Analysis
November 1998 Sampling
COS Samoa Packing

provided in the Technical Memorandum describing the bioassay tests conducted with the March 1995 effluent sample (CH2M HILL, 20 June 1995).

Samples were collected from the established effluent sampling site following the established composite sample collection schedule for the priority pollutant analyses. A total of eight individual grab samples were collected into pre-cleaned glass containers at approximately three-hour intervals over a 24 hour period. The samples were stored on ice until the completion of the 24-hour sampling period, and then a flow-weighted composite sample was prepared. The grab sample collection times and the calculated individual volumes of each grab sample used to create the composite sample, based on COS Samoa Packing's flow records, are summarized in Table 2. The final composite sample was used to fill the sample containers sent to the laboratory for analyses. The pH of the samples for analysis of metals and total phenol was measured prior to shipping and was less than 2.0 SU. A duplicate sample was taken and shipped without preservative for copper analysis using co-precipitation.

Sample containers were wrapped in bubble-wrap, placed in zip-lock bags, and packed on ice for shipment to the laboratory. Sample chain of custody forms were completed, sealed into zip-lock bags, and taped inside the lid of the ice chest. Samples were shipped to the laboratory via DHL. Samples that were composited on 20 November, were received at Analytical Resources, Incorporated (ARI) 23 November 1998.

Results

Laboratory data sets, laboratory quality control data reports, and chain-of-custody form are attached to this memorandum. The chain-of-custody form is included as Attachment I and the laboratory analytical data sheets and quality control data reports are included as Attachment II. Table 1 indicates the detection limits requested from the analytical laboratory along with those achieved during the analysis. The laboratory indicated, prior to sample analysis, that the requested detection limits could be achieved. In order to achieve requested detection limit, copper was analyzed using method EPA 200.7, following extraction by co-precipitation.

Semivolatile organics were all at the non-detect level with the exception of phenol, 4-methylphenol, and bis (2-Ethylhexyl) phthalate. Bis (2-Ethylhexyl) phthalate was detected at 79 µg/l. Phenol and 4-methylphenol are compared with past sample results in Table 3. Total recoverable phenols were detected at 60 µg/l.

Table 3 summarizes the sample results for substances detected for the November 1998 effluent sample analysis compared to those detected during previous analyses. The analyses detected six chemical parameters in the effluent from COS Samoa Packing. Arsenic, copper, selenium, and zinc were detected at comparable levels with those previously reported. Cadmium was detected at 3 µg/l and lead was detected at 2 µg/l, both near the reported limit of detection (2 µg/l and 1 µg/l respectively).

Effluent Chemical Analysis
November 1998 Sampling
COS Samoa Packing

Table 1 Effluent Sample Analyses and Handling Procedures COS Samoa Packing, 19 - 20 November 1998						
Chemical Parameter	Analytical Method Requested	Detection Limits, µg/l		Sample Holding Time	Sample Container	Sample Preservation
		Requested	Achieved			
Semivolatile Organics	EPA 625	10-50	20-200	7 days	1 liter amber glass	4 °C
Phenols	EPA 420.1	10	40	28 days	500 ml plastic	4 °C, 5 ml H ₂ SO ₄ ¹
Inorganics ²						
Arsenic	EPA 206.2	5	2	6 months	500 ml plastic	4 °C, 5 ml 2N HNO ₃ ¹
Cadmium	EPA 200.7	5	2	"	"	"
Chromium	EPA 200.7	10	5	"	"	"
Copper	EPA 220.2	2	2 ³	"	"	"
Lead	EPA 239.2	5	1	"	"	"
Mercury	EPA 245.1	0.4	0.1	"	"	"
Selenium	EPA 270.1	5	5	"	"	"
Silver	EPA 272.2	2	0.2	"	"	"
Zinc	EPA 200.7	20	4	"	"	"
¹ Additional HNO ₃ and H ₂ SO ₄ was added to the sample as necessary to bring pH equal to or less than 2 at the time of composting the sample. ² All Inorganics were from one 500 ml plastic sample container, preserved with 5 ml 2N HNO ₃ , with pH of filled sample bottle measured at 1.65. An un-preserved duplicate sample was taken for Copper analysis using co-precipitation. ³ Method EPA 200.7 used to achieve this detection limit following extraction by co-precipitation.						

Effluent Chemical Analysis
November 1998 Sampling
COS Samoa Packing

Table 2 Effluent Chemistry 24-hour Composite Sample Collection COS Samoa Packing, 19 - 20 November 1998						
Grab Sample Number	Sampling Time	Sampling Date	Effluent Flow Rate (mgd) ¹	Percent of Total Flow	Volume of Sample (ml)	
					1 liter	500 ml
1	1200	11/19/98	0.88	13.1	131	65.5
2	1500	11/19/98	0.88	13.1	131	65.5
3	1800	11/19/98	0.88	13.1	131	65.5
4	2100	11/19/98	0.80	11.9	119	59.5
5	2400	11/19/98	0.80	11.9	119	59.5
6	0300	11/20/98	0.80	11.9	119	59.5
7	0600	11/20/98	0.80	11.9	119	59.5
8	0900	11/20/98	0.90	13.4	134	67
TOTALS			6.74	100.3	1003	501.5
¹ Mean effluent flow rate 0.84 mgd.						

Effluent Chemical Analysis
November 1998 Sampling
COS Samoa Packing

Table 3
Summary of COS Samoa Packing Effluent Chemistry Sample Results
February 1993 - November 1998

Substance	Previous Sample Results, µg/L (ppb)											Nov 1998 Sample Results, µg/L (ppb) 1998
	Feb 1993	Oct 1993 ¹	Feb 1994	Oct 1994	Mar 1995	Feb 1996	Mar 1996	Nov 1996	Mar 1997	Sep 1997	Jun 1997	
Inorganics												
Arsenic	9.8	ND (15)	25	25	32	14	ND ²	16	24	24	21	18
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3
Copper	21	(ND) (ND)	13	23	9	54	ND ³	11	11	12	24	12
Lead		ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2
Selenium	4.3	ND (2.5)	ND	ND	ND	5.4	ND	ND	2	ND	12	7
Silver	ND	ND	22	16	33	<50 ⁴	ND ⁵	ND	ND	ND	ND	ND
Zinc	380	400 (540)	660	760	570	440	740	471	484	585	657	585
Semivolatile Organics												
Benzoic Acid	120	ND	ND	ND	ND	ND	ND	ND	ND	53 ⁶	ND	ND
Bis (2-Ethylhexyl) phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	79
Phenol	110	ND	69	120	32	110	89	150	73	52	51	65
4-Methylphenol	670	1600	770	2800	2400	1600	6800	1800	860	1600	420	430
Total Recoverable Phenols	NA	570	84	280	150	170	170	140	80	70	70	60

ND = Not Detected NA = Not Analyzed

¹ Values in parentheses are results of reanalyzed samples (see Technical Memorandum for October 1993 sampling episode).

² Detection limit raised to 400 µg/l because of matrix interference, with the resultant concentration <400 µg/l each time.

³ Detection limit raised to 25 µg/l because of matrix interference, with the resultant concentration <25 µg/l.

⁴ Detection limit raised to 50 µg/l because of matrix interference, with the resultant concentration <50 µg/l each time.

⁵ Detection limit raised to 200 µg/l because of matrix interference, with the resultant concentration <200 µg/l.

⁶ Detected at dilution 1:3, ND at dilution 1:40.

ATTACHMENT I

CHAIN-OF-CUSTODY FORMS

COS Samoa Packing Company, Inc. Effluent Sample

19 - 20 November 1998

ATTACHMENT II

LABORATORY DATA REPORT
Analytical Resources, Inc.

COS Samoa Packing Company, Inc. Effluent Sample

19 - 20 November 1998